

What is claimed:

1. An isolated soluble non-fibrillar amyloid β protein assembly comprising 3-12 amyloid β proteins and having neurotoxic activity in organotypic brain slice cultures from adult animals.
- 5 2. An isolated amyloid β protein assembly according to claim 1 wherein the assembly is a soluble non-fibrillar globular structure with dimensions approximately 4.9 - 5.3 nm as measured by atomic force microscopy having a molecular weight of 23-24 kD.
3. An isolated amyloid β protein assembly according to claim 1 wherein the assembly is a soluble non-fibrillar globular structure with dimensions approximately 5.7 - 6.2 nm as measured by atomic force microscopy having a molecular weight of 27-28 kD.
4. A method for measuring the vivo effects of the protein assembly of claim 1 comprising:
 - (a) administering the protein assembly of claim 1 to an animal, and
 - (b) conducting the LTP procedure by;
 - (i) administering an electrical stimulus and
 - (ii) measuring the cell body spike amplitude
- 20 5. A method for protecting brain cells against toxicity of amyloid β protein comprising blocking the formation or activity of the

protein assembly of claim 1.

6. A method of treating or preventing Alzheimer's disease and related dementias and memory disorders in human beings by blocking the formation or the activity of the protein assembly of claim 1.

5 7. A method for detecting the protein assembly of claim 1 comprising:

- (a) contacting the test material with 6E10 antibody; and
- (b) detecting binding of the antibody.

8. A method for detecting the protein assembly as claim 1 comprising:

- (a) contacting test material with B103 neuroblastoma cells, and
- (b) measuring morphological changes in said cells.

9. A method for detecting the protein assembly of claim 1 comprising:

- (a) contacting the test material with brain slice cultures, and
- (b) measuring brain cell death.

10. A method for detecting the protein assembly as claim 1 comprising:

- (a) contacting test material with B103 neuroblastoma cells, and
- (b) measuring increases in fyn kinase activity.

11. A method for identifying compounds that block receptor binding of the protein assembly of claim 1, comprising:

- (a) mixing test compound with cell culture media after formation of the protein assembly of claim 1.
- (b) contacting the mixture of 10 (a) with B103 cells or other neuronal cells.
- (c) adding a labeled reagent that can bind to the protein assembly of claim 1.

10 (d) detecting the presence of the labeled reagent bound to the protein assembly of claim 1.

12. A method for identifying compounds that block formation of the protein assembly of claim 1, comprising:

5 (a) mixing test compound with media before in the procedure to form the protein assembly of claim 1, and

(b) contacting the mixture of 10 (a) with B103 cells or other neuronal cells.

(c) adding a labeled reagent that can bind to the protein assembly of claim 1.

(d) detecting the presence of the labeled reagent bound to the protein assembly of claim 1.

(e) test compounds exhibiting more inhibition of receptor binding of the protein assembly of claim 1 when the test compound is added before the formation of the protein assembly of claim 1 compared with addition of test compounds after formation are compounds that block formation of the protein assembly of claim 1.

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